Tachycardia Detection System Using Pulse Sensor

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Abstract

Abnormal heart rhythms (arrhythmias) are sequences of heartbeats that are irregular, too fast, too slow, or conducted via an abnormal electrical pathway through the heart. Tachycardia developed system arrhythmic pulse detection, measuring the physiological parameters of human health may be affected through temperature and heart rate. The detect pulse to pulse by using PPG sensor, provide beats to differentiate in arrhythmic sensor and is very quick to detect signals to occurring everyday life in link characteristics of the patients. This project used a heartbeat sensor, LM358 amplifier and signal processing that the detector monitors to transfer and transmit to the microcontroller. At the receiving end, signal processing is used by the amplifier in detector circuits. The input signal system in the microcontroller gives the results of pulses and display using LCD at the receiving end. Typically, a healthy heart rate is 60-100 beats per minute. So, the process of Tachycardia detection PIC microcontroller system in this project is to use a signal from the input and process the pulses to give the results to LCD in microcontroller connection, detect the condition of the signal.

Introduction

Tachycardia detection represented on the ECG as a series of waves and electrocardiogram is a test that records the electrical activity of the heart.
ECG is used to test for irregularities in how the heart functions. In the electrical heart, the way the electrodes placed on different parts of the body. An electrocardiogram is the P wave, T wave, and QRS complex as showing in the figure(1). The pulse of the natural heart is very reasonable and very similar in all areas. The normal heartbeat is very regular and very similar across the board some people have a very fast heartbeat so, this could happen when movement heart went up and down or a flight of stairs. Some people have a very slow heartbeat, either at rest or just somebody who is quite athletic, and their heart beats slower because they have a very efficient cardiovascular system. Sometimes in ECG people have irregular heartbeats many different heart conditions can cause the heart to beat irregularly and being able to examine that. The electrical behaviour of the heart is significant for diagnosing problems related to cardiovascular health.
According to the cardiac parameters for a healthy body, the heart rate is lower at rest and higher during exercise. Typically, the pulse varies from low to high levels when relaxing and doing stressful activity respectively. The discrepancy changes from person to person depending on several variables, including body type, environment, gender, fitness, medications, etc. As such, the pulse can help doctors to give results for treatment. A person's heartbeat is between 60 to 100 beats per minute. Adults have a lower heart rate than children on average.

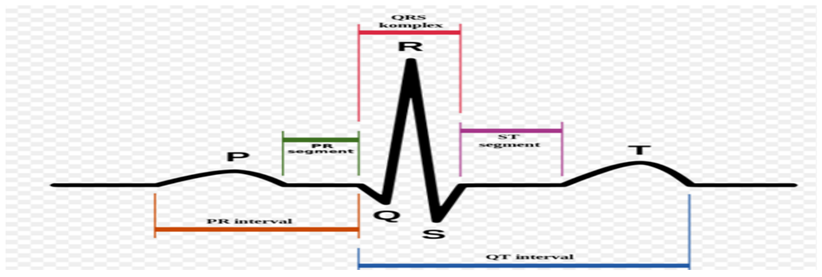

Figure1: Electrocardiogram(wikilectures.eu.co.2018)

Heart rates can vary when changing posture, particularly when becoming upright from a seated or lying position. Importantly, under these conditions, blood pressure changes are not supposed to be observed and do not form part of the diagnosis.

P wave

Is full of blood to create an action between the left and right of heart. A wave of atrial that the electric impulse unable to be seen to causes low amplitude. Also, the SA node generates the signal, and then that signal spreads to the muscle cells in the atria. The P wave is depolarization of the atrial to see the peck. A normal P wave of the heart is two and a half millimetre divisions.

QRS wave

QRS wave is depolarization of the ventricles that is what is represented by the QRS complex. This complex consists of three waves. Q wave is (downward deflection),R wave (upward deflection) and the S wave (downward deflection). It represents the contraction of the right and left ventricles of the heart, Produces a much higher amplitude voltage than any other portions of the electrocardiogram. Is because the ventricles are much thicker than the atria and provide a more powerful contraction.

PR Segment

Is the point at which the AV node delays the signal, it depolarises and sends the electrical message through the bundle of veins and the fibres located in the walls of the ventricles, does not cause contraction of the ventricles just yet.

T wave

Is repolarization of the ventricles and probably wondering where the signal that comes from the ventricles are significantly large than this little signal that comes from the atria but if the heart considerably smaller than the ventricles? When the heart relaxes, that period T wave extends from a peak to a flat slope. If the cells in the ventricles depolarize, that is going to have a much higher effect on the ECG because more cells depolarising sends a stronger signal, which in turn leads to repolarisation.

ST Segment

All the cardiac cells in the ventricles have depolarized, at which point the repolarization of cells in the ventricle begins.

Aims and Objectives

Aims

Design, build and develop a low cost tachycardia detection system.

Objectives

- Perform comprehensive literature search on tachycardia detection system by using pulse sensor.
- Suggest and choose potential solutions to the problem.
- Build and test tachycardia detection system using pulse sensor of technology to be safe and secure -to- use for healthy patients.

Methodology

It is recommended to apply fingertip to the patient if the treatment signal determines that the cardiac pulse is current in the patient and the ECG data acquired from the patient point a cardiac of the rhythm Suitable for direct treatment. Electrocardiogram and transmit signal data in the patient to the processing health care, in particular to analysis methodically the ECG data piezoelectric signal and select identical in real time with a ventricular for the cardiac analysis pulse. So, the pulse sensor is used to count heartbeat per minute and display that sensor to confirm the device received signal for optical heartbeat monitor. In this method using the sensor that fingertip and read the amount of infrared light reflected by the blood circulating inside a body, where the heart pumps blood pressure rises sharply or does the amount of infrared from the emitter that gets revealed to the detector passes more current when it receives more light.
The PIC16F877A microcontroller and pulse sensor are used to count heartbeat per minute. To apply and test pulse sensor rate and displayed on LCD. A display is ending by an output of pic microcontroller to contains components which are onboard that includes segment displays and drives for each. PC do a real-time display of pulse sensor or signal to confirm the device received a message and LED signal is high when pulse reasonable signal. A pulse sensor is handy for optical heartbeat monitor and made up of amplification circuit as sensor or noise circuit to steady heartbeat from output voltage of the waveform.

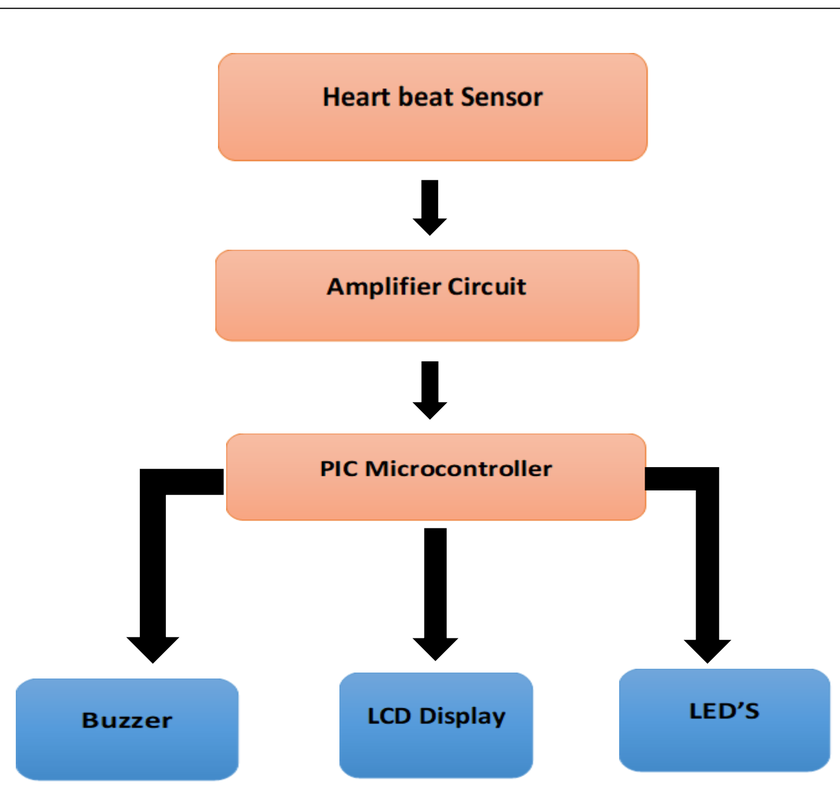

Figure 2: Block Diagram Of The Tachycardia Detection System Using Pulse Sensor

Conclusions

Tachycardia detection determines for an efficient system to calculate the heartbeat per minute, technical according to a strict application to improve patient's health. Monitoring the heartbeat by using fingertip sensor to read, measure cardiac, that design and problem monitor to focus on pulse detection of quality of health.
This system has a low cost, measures the heartbeat using a fingertip sensor and monitors body temperature of the patient. In real time the system reads and analyses the heart rate signals to transmit measurements and warmth to an LCD monitor, which is continually updated. Such a device could be useful for people who are proficient in sports or physical exercise during activities. This device can be easily implemented as a resource to benefit from the smartphone or watches provided by this system.

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